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Coding, Individualization & Programming

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Coding, Individualization & Programming (CIP)

Model: All

Production: All

OBJECTIVES

After completion of this module you will be able to:

- Distinguish between Coding & Programming
- Understand the importance of Coding & Programming
- Understand where data is stored in a Control Module
- Understand the purpose of CIP and what it means
- Program/update installed modules
- Access retrofit functions
- Access Individualization functions
- Access ZCS functions

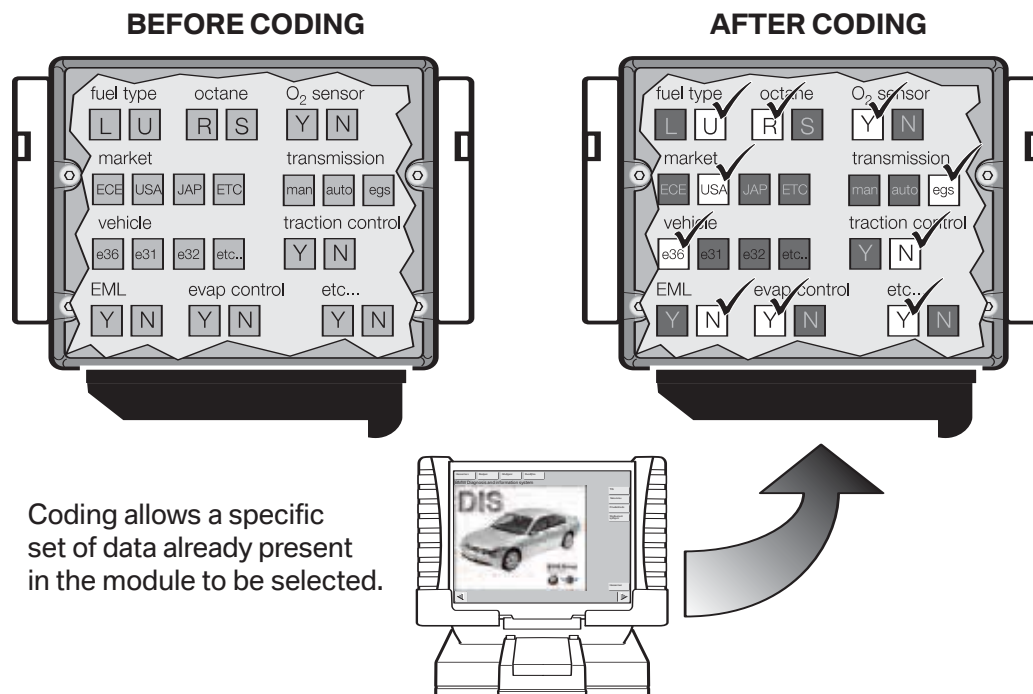
Fundamentals of Coding and Programming

What is Coding?

It is a process utilized by BMW, which groups system specific operating requirements (Data) together and then assigns a label/code to each of these groups of data. The various groups of data are all pre-loaded into system specific “codable” control modules, along with a basic set of operating instructions (Program).

Types of operating requirements:

- Nominal values of device input signals (0.25V to 2.5V, 5W - 25W, ...)
- Type of device input signal (PWM, square wave, analog ...)
- Operational parameters (device activation/deactivation time, ...)
- Market specific operations (O2 Sensors, Fuel Type, Emission Control, ...)
- Country Specific Regulations (U.S., Canada, Japan, UK, ECE, ...)
- Powertrain Configurations (Manual, Auto, Diesel, ...)



The procedure of assigning one specifically labeled group of data to the operating program of a specific control module/component is referred to as “coding”.

A “codable” control module has a basic operating program already installed along with several specific variations of operating data. The coding process allows a specific set of operating data to be assigned to the basic operating program of that module/component, with respect to its specific application.

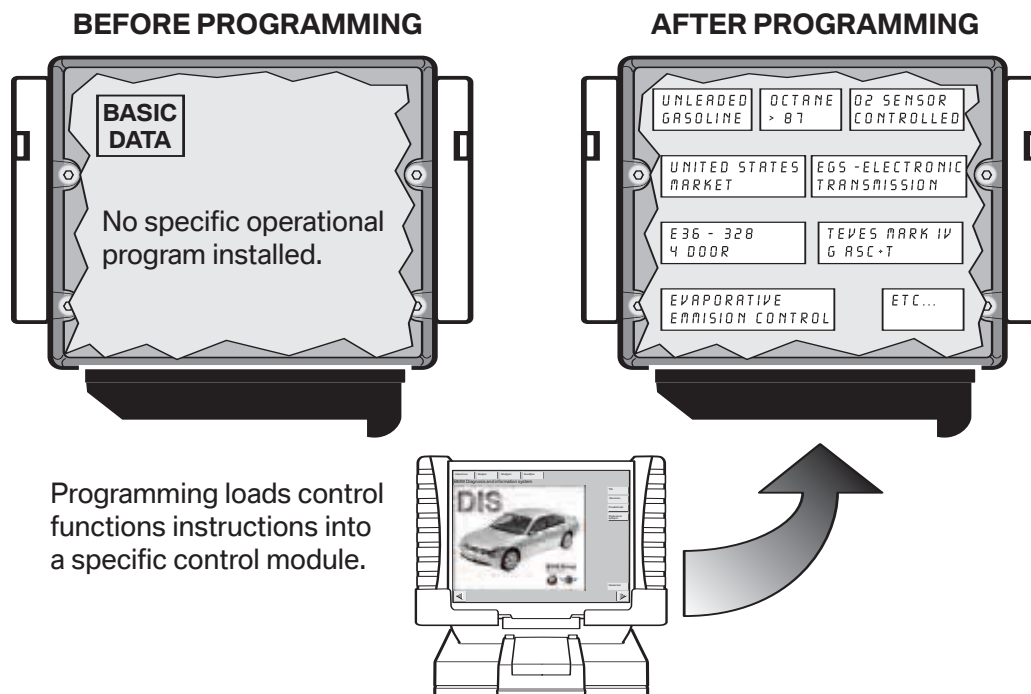
Coding can be performed for some systems/components:

- Selecting customer specific system operational settings from a list of available features (VKM)
- Automatically by selecting a specific coding process available via ZCS Coding or CIP using the DISplus/GT1/SSS.
- By using a coded ground wire to a module.
- Determined at the factory.

Note: Codable control modules/components are system specific, which means that not all control modules are codable.

What is Programming?

It is a process utilized by BMW to load application/system specific operating instructions (Program) into a module/component which already has the systems operating requirements (Data) installed, plus it can be used as a means of updating data and operating instructions previously installed in a control module.



Basic programmable control modules have a pre-defined set of operating data already installed which allows the module to be fairly generic until a specific operational program is installed.

Programming of system control modules is performed using a DISplus/GT1/SSS.

Note: Programmable control modules are system specific and not all control modules are programmable using workshop equipment like the DISplus,GT1 or SSS. The ability to program a module is limited to the number of times it has already been programmed and the hardware version of the control module itself.

What is the Purpose of Coding and Programming?

As a global manufacturer, BMW must design a large variety of control modules to meet numerous vehicle requirements pertaining to issues such as:

- Country Specific Regulations (U.S., Canada, Japan, UK, ECE, ...)
- Vehicle Equipment Level (Phone, Navigation, HiFi, IHKA, IHKR, ...)
- Vehicle Powertrain Configurations (Manual, Auto, ...)
- System Specific Operating Requirements (Nominal values, type of input signal, ...)

By using Coding and/or Programming, the large variety of control modules needed can be reduced to a smaller number of model specific hardware variations.

Codable control modules contain:

- A common operating program
- A large number/variety of specific operating data groups

In order to use this type of control module it must first be CODED to ensure that the operating data specific to that vehicle/model application is used by the operating program of the control module.

Programmable control modules contain:

- The required/specific operational data
- No operating program

In order to use this type of control module it must first be PROGRAMMED to ensure that the operating program specific to the vehicle/model application is used.

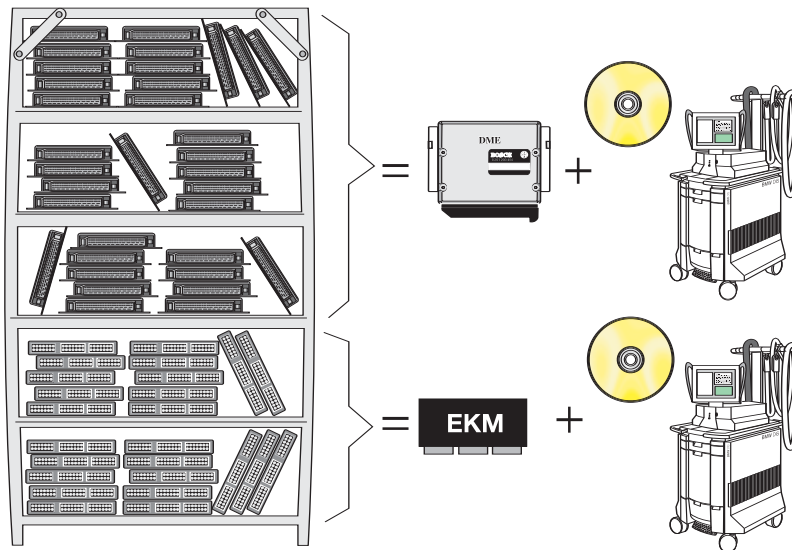
Prior to the availability of Coding and Programming in the workshop this task could only be performed at the factory.

Initially the factory installed Control Module(s) with a common operating program or data into vehicles and as these vehicles reached various points in the assembly process the control modules were updated with the required operating data or program specific to the application for that particular vehicle. Since replacement parts always need to be available, parts inventory needed to contain all variations of preprogrammed control modules installed in all varieties of vehicles that were manufactured. This was not a big problem in the early years, when the variety/quantity of models was smaller.

As the number of control modules and the complexity of the various systems installed into vehicles increased, the number of modules that needed to be stored in parts inventory began to increase as well. Eventually this led to the stocking of hundreds of different control modules that were either pre-programmed or pre-coded for a specific application and model, but only differed slightly in the way they were coded or programmed.

Pre-programmed and pre-coded control modules always needed to be available in the event a control module failed once the vehicle left the factory floor, since this was the only place programming & coding procedures could be performed. In order for repairs to be made quickly, dealers were required to maintain a stock of several varieties of control modules, since technicians could only remove the failed module and installed a new pre-programmed or pre-coded module into the vehicle.

As a result of having to maintain a very large inventory of pre-programmed and pre-coded control modules in parts inventory, it was decided to make coding and eventually programming available in BMW workshops.



The following advantages have occurred since programming and coding can be performed in the workshop:

- Fewer control module hardware versions are needed (only need basic control modules)
- Lower parts and inventory costs
- Able to update software in a control module without having to replace the module (Re-Code/ Re-Program to address service Measures)
- Ability to add special equipment features to existing control modules (DWA, Day Time Running Lights, ...)
- Customization of vehicle operation (Conversions, VKM, A/C, ...)

The means by which coding or programming information is provided to a control module varies and is determined by the vehicle, model year and type of module(s) installed.

BMW currently uses the following methods to perform Coding or Programming:

- Coding Plug
- DME variant Coding
- Coding Code
- Central Coding Key (ZCS) or Vehicle Order (VO)
- EPROM Programming
- Flash Programming
- Vehicle and Key Memory (VKM)

Where is Data Stored in a Control Module?

The control modules used in our vehicles store data/information on one of the following:

- EPROM (Electrically Programmable Read Only Memory)
- EEPROM (Electrically Erasable Programmable Read Only Memory)

in essence these devices are similar to the hard drive of the PC (**P**ersonal **C**omputer) that many of us use daily to store the images and documents/files of information.

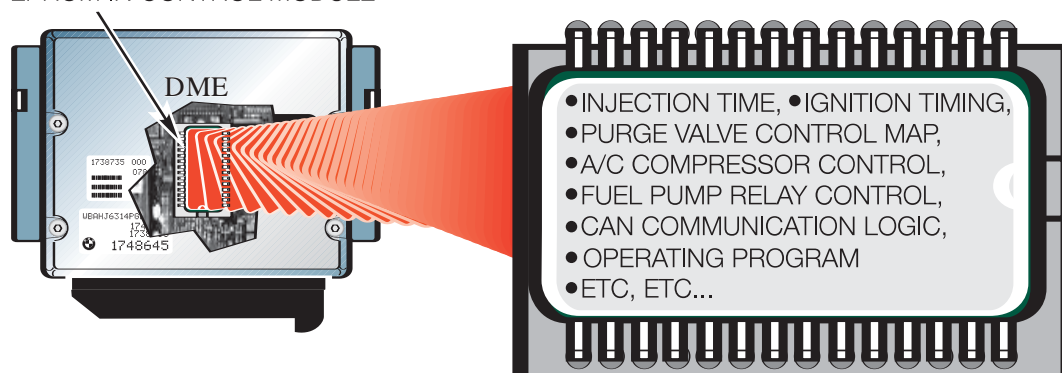
EPROM (Electrically Programmable Read Only Memory)

An EPROM is a computer memory chip that can be electrically programmed, however this chip cannot be erased using normal means.

In order to erase data that is stored on the chip it must be removed from the device and exposed to UV lighting for a specific time period. An EPROM has what is commonly called a “window” on the top portion of the chip usually located underneath a protective label, it is this area that must be exposed to UV light of a certain intensity for a specific time period in order to erase the information stored on it.

BMW does not currently utilize EPROMS on current vehicles.

EPROM IN CONTROL MODULE



EEPROM (Electrically Erasable Programmable Read Only Memory)

An EEPROM is a computer memory chip that can be electrically programmed and electrically erased, thereby not requiring the chip to be removed from the module or exposed to light. In general this chip is not easily removable from the device it is installed into (it is usually soldered in its place).

Since the entire process of programming and erasing is done electronically this device is commonly referred to as “**Flash Programmable**”.

During the programming process the following type of information may be loaded into the control module depending on the specific application or update that needs to be installed:

- Characteristic Maps (Ex. Ignition, Injection, Purge Control, DSC Regulation, ...)
- Control Constants/ Operational Data
- Operational Program
- Control Module Identification Information (Ex. Hardware Number, Program Number, Date of Modification, ...)

At this moment, modules with EEPROMS can only be flash programmed (“**flashed**”), can only 14 times total. If the module has to be programmed a 15th time, it has to be replaced.

What is needed to Code and Program?

In order to code or program a vehicle or control in the workshop, specific equipment and special software is required such as a DISplus, GT1 and an SSS which must all be connected to a network and have the most current version of CIP (**C**oding, **I**ndividualization & **P**rogramming) installed. CIP is the software program that contains all the latest data and program information to allow control modules to be updated to the latest level to address customer concerns and implement service solutions.

With the release of CIP 14.0 and the implementation of Progman (see Progman section for additional information) the DISplus and GT1 will only be capable of performing vehicle diagnosis and activation/initiation of a Coding, Individualization or Programming task through the SSS. A special program management tool (Progman) will only allow the DISplus and GT1 to act as remote terminals to the SSS (regarding Coding, Individualization & Programming), which means that the SSS will be the single supplier of Coding, Individualization and Programming information to a vehicle and its respective control modules.

Review Questions

1. *What happens when a control module is coded?* _____

2. *What happens when a control module is programmed?* _____

3. *What advantage is there by allowing workshops/centers to code and/or program control modules?* _____

4. *What component(s) stores data in a control module?* _____

Vehicle Coding Information

Introduction

As part of an ongoing process to reduce the need for country, model and option specific control modules, BMW utilizes a multi digit vehicle coding structure referred to as a Central Coding Key (ZCS).

The Central Coding Key (ZCS) is a unique 37 digit code that contains specific model, country variation and individual equipment/option information for a vehicle.

GM	16430000P
SA	0000422005009CC0U
VN	000001E116K

During the manufacturing process of a vehicle, the ZCS code is created to identify the specific vehicle being built and to properly code the control modules installed during the assembly process once the vehicle reaches the end of the line. To ensure that the ZCS code can be retrieved once the vehicle leaves the factory it is stored in two control modules, the cluster and the EWS.

ZCS is often referred to as a “key” since it is able to automatically “unlock” or “activate” specific functions of a new control module or can be used to recode a used control module to be compatible with the specific vehicle it has been installed into. With the introduction of the E31 the ZCS information was used for the first time as a coding key for replacement vehicle control modules, this ensured that the replacement modules would be coded to the required specification of the vehicle.

These codeable modules have no limit as to the number of times that they can be recoded.

ZCS Structure

The 37 digit structure of the ZCS is subdivided into three segments. The segments represent specific information about the vehicle.

Each segment ends with a checksum “digit”. A checksum is utilized by the coding software to detect unacceptable/erroneous manually entered coding information.

GM	16430000P
SA	0000422005009CC0U
VN	000001E116K

The information/digits of the ZCS code reflects the options installed in the vehicle and should never be changed manually unless it is necessary for special recoding functions such as:

- Canadian market vehicle being moved to the US
- Retrofit installation of an accessory system (ie. alarm or satellite radio)

For extreme cases; If a modification needs to be made to the ZCS structure and there is no information available in a service bulletin then the Technical Hotline should be contacted for assistance by submitting a PUMA case, requesting a modified ZCS code.

Each portion of the ZCS provides specific information regarding that vehicle:

GM (Grundmerkmale) - Identifies the “Basic Features” of the vehicle and contains 9 digits that are used to describe:

- Vehicle type (R50, R52, R53 ...)
- Specific body style of the vehicle (Convertible, Coupe ...)
- Country specific coding identification (US, UK, ECE ...)
- Unique equipment that affects the basics of the vehicle (with sunroof, without sunroof, wheel size ...)
- Basic language variant (English, Spanish, German ...)

SA (Sonderausstattungs) - Identifies the “Special Equipment” of the vehicle and contains 17 digits that describe what features/functions are installed in the vehicle, such as:

- Power Windows or Manual windows
- Power Door Locks or Manual Door Locks
- Power Sunroof or Manual Sunroof
- Power Convertible Top or Manual Convertible Top
- Satellite Pre-wire

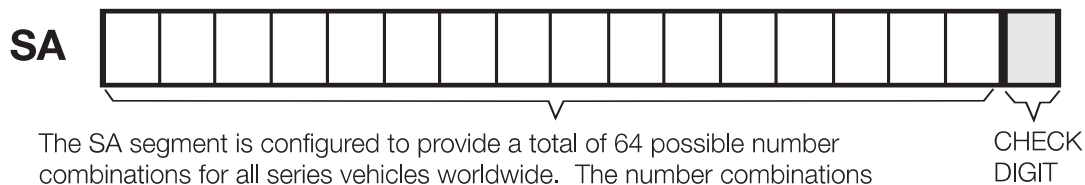
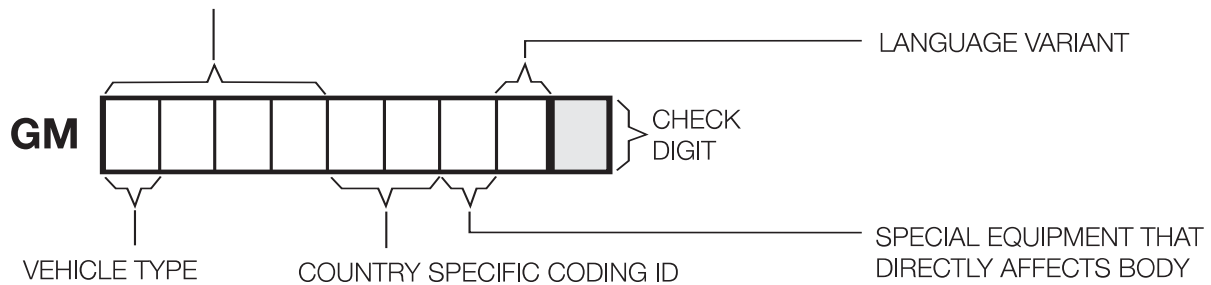
The SA segment is configured to provide a total of 64 possible number combinations (option groups) for all series vehicles worldwide. The information is modified whenever a new component/accessory is added to the vehicle via a retrofit coding procedure.

VN (Versionsnummer) - Identifies the “Version Number” of the vehicle and contains 11 digits that are used to describe:

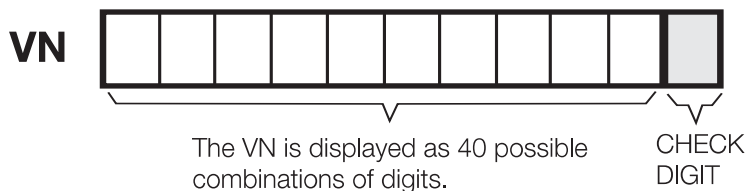
- Series specific coding data that are not reflected in the GM or SA segments. This includes, model year dependent data, software and hardware versions of the control modules installed, coding instructions, etc.

The VN is displayed as 40 possible combinations of digits. A deliberate change in the VN will result in erroneous coding data being used when recoding a module or coding a replacement module which will affect the proper operation of a control module(s) coded with an incorrect VIN.

FOUR DIGIT PORTION REPRESENTS VEHICLE BODY AND SPECIFIC BODY EQUIPMENT (COUPE, SEDAN, ROADSTER, SUNROOF, ETC,)
There are 4096 possible combinations of digits per model.



The SA segment is configured to provide a total of 64 possible number combinations for all series vehicles worldwide. The number combinations are special equipment option packages.



ZCS Stored Location in Vehicle

The ZCS is stored in the vehicle to simplify the coding procedures when a module needs to be recoded or a replacement module needs to be coded. Depending on the vehicle, the ZCS information is stored in the following locations:

Vehicle	Model	Module	Vehicle	Model	Module
E31	All	EKM	E39	All	Instrument Cluster/EWS
E32	All	Instrument Cluster	E38	All	Instrument Cluster/EWS
E34	All	Instrument Cluster	E46*	All	Instrument Cluster/LSZ
E36	318i/is 325i/is M3	Instrument Cluster	E52	All	Instrument Cluster/LSZ
E36	318ti Z3	EWS II As of 9/98: Instrument Cluster/EWS	E53	All	Instrument Cluster/LSZ

* The E46 switched to a Vehicle Order (VO) data structure in 9/01.

The procedure to code control modules that utilize the ZCS information can be performed via the DISplus/GT1 or SSS using Progman with CIP 15.0 or higher and accessing the “Codierung ZCS/FA” function. Always reference service bulletins for information regarding the latest coding version and any possible software errors.

When coding a ZCS codable control module the coding program in CIP automatically searches the stored location, based on the VIN, and codes the selected module according to the information provided in the ZCS code.

On later production vehicles the ZCS information began to be stored in two locations, referred to as redundant data storage, this insures that the information is always available in the event the primary device storing the data fails.

Note: On early production vehicles without redundant data storage, if the module being coded or recoded is the module that stores the ZCS information, then the vehicles ZCS information must be obtained from the label located on the vehicle or electronically accessed from the module and printed out then entered manually via the input screen on DISplus/GT1 or SSS.

For vehicles with redundant data storage the coding of the module storing the data is performed automatically using the information stored in the “back up” module.

Accessing ZCS Information Label

On earlier production vehicles the ZCS label is affixed to the vehicle in a specific location depending on the model:

- E36 - Under rear seat; center area or next to left sending unit of fuel tank.
- Z3 Roadster - In Trunk; under carpet on floor, forward of tool kit.
- E31/32/34 - In fuse box cover
- E38 - In E-Box cover



Note: As of 9/98 production the ZCS label was eliminated from the vehicle. Some older vehicles will have identification labels containing an AM segment, this information is not needed for coding or recoding a control module on that vehicle.

NOTES

Vehicle Order

In 9/01 the ZCS vehicle data structure on the E46 was replaced with what is referred to as the Vehicle Order (VO) or Fahrzeugauftrag (FA). The vehicle order structure is utilized on all new models introduced/produced as of 9/01, such as E65/66, E60, E63/64, E83, E85 etc. Models such as E36, E39, E52, and E53 produced after 9/01 continued to be manufactured using the ZCS structure until production of the model is complete.

Vehicle Order for E46 as of 9/01 Production:

Vehicle identification number: KW17732	E-Wort:	521,522,534,550,639, 645,650,661,674,692, 818,823,832,845,853, 876,825,826,882,302,
Vehicle order:	HO-Wort: 633L,	Vehicle order and vehicle identifica- tion number are stored in
Model series: E46	SA:	KOMBI
Type des. code: EV33	1CA,205,210,240,249,	
Time criterion: 0904	279,354,403,411,431,	
Paint code: 0A08	438,441,459,465,473,	
Upholstery code: N6SW	488,494,495,502,520,	
Assbly. no.:		

Vehicle Order for New Models as of 9/01 Introduction:

Select measures plan.	
Date / time:	10.11.2004 / 13:31
Model series:	E60
Vehicle ID number:	WBANA53584B848013
Vehicle order:	E60_#1203*NA53%0475&LCBA\$1CA\$205\$248\$2RA \$302\$319\$354\$403\$415\$416\$430\$431\$438\$441 \$442\$459\$465\$473\$488\$494\$502\$534\$540\$563 \$605\$609\$620\$639\$645\$676\$694\$697\$785\$818 \$823\$850\$853\$876\$8SP\$925\$992-B110+K639+O111 +O112
Vehicle data status:	E060-04-09-504
Target data status:	E060-04-09-504

The vehicle order format contains information pertaining to the production of a specific vehicle such as:

Series Type - (E46, E65, E60, etc.)

Time Criterion - Identifies date the options/hardware equipment available for installation into the vehicle was standardized/"locked". This information does not refer to the production date of the vehicle. A problem with coding or programming may occur if a module or option based on a newer or older time criterion date is installed into the vehicle.

Model Code (Basic Type) - Base level from which the vehicle is "created/built".

Paint Code - Identifies the color of the vehicle at time of production.

Upholstery Code - Identifies the type of upholstery installed in the vehicle at time of production.

Assembly Number - Identifies the programmed part number for powertrain (Not used)

E-Wort - Identifies additions/options added to the vehicle that are not part of standard SA codes/options

HO-Wort - Identifies options installed at Center/Dealer using 3 digit option code (Currently not used.)

Installed Option/SA Codes - Listing of accessories & equipment options installed in the vehicle.

The information contained in the vehicle order is used to identify the module(s)/system(s) that are/should be installed in the vehicle and also what if any control modules need to be updated if a new system/option is added or removed to/from the vehicle to ensure proper compatibility with the devices installed in the vehicle. The information contained in the vehicle order such as installed options, is modified whenever a new component (module/system) is installed and coded to the vehicle. If the new component is not properly coded to the vehicle the SA listing is not updated and problems can be encountered whenever a measures plan for the vehicle is created, vehicle needs to be recoded or VKM/Individualization functions are to be modified.

A listing of the components that need to be updated is provided whenever a measures plan is generated (refer to CIP module for additional information).

Example: Information contained in the VO of an E60

Select measures plan.	
Date / time:	10.11.2004 / 13:31
Model series:	E60
Vehicle ID number:	WBANA53584B848013
Vehicle order:	E60_#1203*NA53%0475&LCBA\$1CA\$205\$248\$2RA \$302\$319\$354\$403\$415\$416\$430\$431\$438\$441 \$442\$459\$465\$473\$488\$494\$502\$534\$540\$563 \$505\$609\$620\$639\$645\$676\$694\$697\$785\$818 \$823\$850\$853\$876\$8SP\$925\$992-B110+K639+O111 +O112
Vehicle data status:	E060-04-09-504
Target data status:	E060-04-09-504

Series Type: E60

Time Criterion: Identified as 1203 indicates the date (month/year) that the list of available options/hardware available for installation into the vehicle was standardized/"locked". Although the vehicle referenced was produced in 6/04 the time criterion of 1203 is still valid and indicates that no changes were made to the available option packages/hardware available for installation into that specific model since 1203.

Model Code: Identified as NA53 indicates the vehicle and engine type plus provides information pertaining to the country the vehicle was built for (i.e. LH or RH drive). If an automatic transmission is installed it will be considered an NA63, however the model code contained in the VO will always reflect the base level which is a manual transmission vehicle.

Paint Code: Identified as 0475 indicates the color of the vehicle at time of production.

Upholstery Code: Identified as LCBA indicates the type of upholstery installed in the vehicle at time of production.

Installed Option/SA Codes: Listing of accessories & equipment options installed in the vehicle
 1CA - Selection COP relevant vehicles
 205 -Automatic transmission
 248 - Steering Wheel Heating
 2RA - LT/ALY wheels

Review Questions

1. *What is the purpose of a ZCS code in a vehicle?*

2. *Where is the ZCS code stored in a vehicle?*

3. *How can you determine what modules in the vehicle are codeable via the ZCS code?*

4. *What is the purpose of a Vehicle Order what information does it contain?*

5. *When was the VO structure introduced?*

6. *Which models utilize a VO structure?*

7. *How can the VO information of a vehicle be accessed?*

Control Modules Flash (EEPROM) Programming

An EEPROM is an Electrically Erasable Programmable Read Only Memory chip that is soldered onto the circuit board of a control module. This signifies that programs & data stored on the chip can be electrically erased and replaced with new/ revised programs or data.

In order to erase the data on the chip a short duration low level voltage/charge is applied to a pin on the EEPROM and the stored data is erased, hence the name “Flash”. Once the data is erased new data is loaded.

By using a this technology, control modules have the ability to be updated a total of 13 times before they need to be replaced.

Theoretically an EEPROM can be erased and reprogrammed more than 13 times, BMW set the number to 13, since a point will be reached where the update being installed may no longer be compatible with the hardware of the installed module which could result in erroneous operation. If the program is not compatible with the hardware version of the module, the program used to determine the correct update for the module will indicate that the module will need to be replaced before the update can be performed.

The reference to Flash programming is a result of the technology used to erase the EEPROM prior to installing a new program and or data.

The utilization of EEPROMs started with Engine Management Systems and has expanded into other control modules.

Determination Process for DME EEPROM

The CIP program is used to determine the correct replacement part numbers (Control Module or software update) to be installed.

For modules that utilize EEPROMs/Flash programming the determination process is done automatically as part of determining a measures plan.

Coding, Individualization & Programming

Introduction

With the introduction of the E65 in 2001, BMW not only introduced a vehicle loaded with the latest technology but also introduced a new way of performing vehicle coding and programming. In order to code and program an E65, a software program commonly referred to as CIP was introduced. The acronym CIP stands for **C**oding, **I**ndividualization & **P**rogramming and with the introduction of Progman & CIP 15.0 it has become the sole software tool for coding and programming vehicles.

Initially CIP was developed for use on the E65/E66 and newer models but has since been expanded to include all vehicles produced prior to the introduction of the E65 that utilize a an SGC/UNIX programming structure.

The intention of the CIP program is to insure that whenever a module is updated or replaced it will still be compatible with all the other modules installed in the vehicle (equipped with a MOST bus). Since all of the communication between the various modules installed in a vehicle is over a bus network structure, it is very important that all of the installed modules be able to communicate with each other without problems.

To ensure compatibility/seamless integration between control modules, the CIP software reads out the part numbers of all the control modules installed in the vehicle as well as the software levels of the respective modules. The information from the various installed modules is then cross referenced against a “master reference list” to determine if a module(s) needs to be updated and how this update will effect the other installed modules. Once this cross reference process is started it can result in additional issues such as:

- If the software level in a selected module is updated will the hardware of the module still be able to function correctly.
- If the software to be installed is not going to be compatible with the installed hardware then the module will need to be replaced.
- If updated software is installed in the selected module will this have any impact on any other installed modules and will they need to have the software updated or will the hardware need to be updated in additional modules in order to install the revised software.

Example: *A desktop computer originally built with a Pentium I, 75 Mhz processor using Windows 95 is not able to operate using Windows 2000. In order to operate with Windows 2000 this old desktop computer needs to be upgraded with new hardware. However, a desktop computer designed to operate with Windows 2000 can be updated to Windows XP without having to upgrade the hardware of the computer.*

All hardware devices that utilize software/programs to operate can only have the installed software updated a certain number of times before the operating capacity of the installed hardware is exceeded and no longer compatible, this results in the device no longer being able to function. In order for these devices to continue to operate the installed hardware/control modules will need to be updated, which is what happens in our vehicles or desktop computers over time.

Specific information pertaining to coding and programming with CIP are provided in **SI B 09 05 01**.

Integration Levels

All new models produced as of the E65 have a minimum allowable software level, based on production date, which is referred to as an integration level or data status. The integration level defines the software level that all the control modules installed into a particular model, at time of production, must be at in order to ensure compatibility. Once an integration level for a specific production period is defined/“locked”, the modules installed in those vehicles can not be updated beyond that level.

The Integration level or data status for vehicles equipped with a most bus is provided in the “Status report” or “Measures plan” as shown below.

Vehicle data status: E060-04-09-503

Target data status: E060-04-09-555

If the vehicle data status and target data status are not the same, this indicates that some of the installed control modules need to be updated to bring the vehicle up to the latest level.

If the software levels were not locked it would be quite complex to track all software and hardware variations for all models through all production ranges. It would be extremely difficult to determine what software and hardware level is compatible with each module installed in a specific vehicle(s) and exactly what needs to be updated if one module is updated or replaced, therefore a limit or locked point must be define for specific production periods by model.

Example: *MY2002 vehicles can not be programmed with software that is assigned to MY2003 vehicles since the defined integration level for each Model Year is different. Similarly Windows 2000 can not be installed & operated on a computer originally developed to run with Windows 95.*

Information contained in this module is for reference as a user guide, more detailed information can be obtained from the respective Service Information Bulletins

SI B09 05 01 & SI B09 03 98.

Measures Plan

A measures plan is generated by CIP to identify what if any control modules need to be updated in order to bring a vehicle up to the latest integration level or data status. The measures plan also identifies the part number of the old/installed programmed control module and also what the new part number will be after the update is performed.

Select measures plan.

Date / time: 21.12.2004 / 12:39
 Model series: E60
 Vehicle ID number: WBANA73525B813674
 Vehicle order: E60 #0904*NA73%0A07&LCAD\$1CA\$205\$248\$2CF
 \$302\$319\$354\$403\$430\$431\$433\$441\$442\$459
 \$465\$473\$488\$484\$502\$508\$522\$524\$534\$540
 \$563\$605\$609\$620\$633\$645\$676\$683\$694\$697
 \$785\$818\$823\$845\$850\$853\$876\$892\$8992+B110
 +K633
 Vehicle data status: E060-04-08-503
 Target data status: E060-04-08-555

	Old part no. progr. ctrl mod.	New part no. progr. ctrl mod.
1. Program CAS (via DIAGBUS)	6960978	6963828
2. Program CCC-GWIM-ASK-GW (via DIAGBUS)	6955213	6950600
3. Program DME/DDE		

Control module SELECTION

- DME/DDE
- Programming
- Update software
- Special measure

Accept

Print or copy out the desired measures plan.

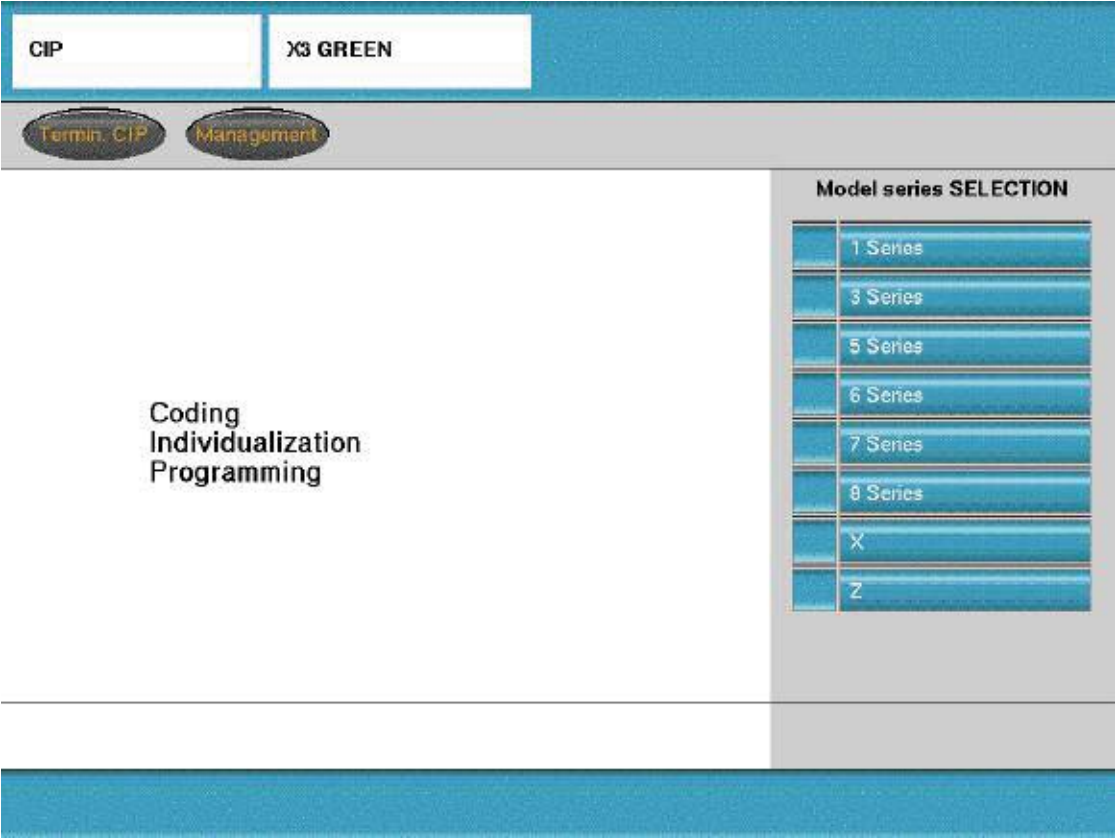
By accepting the defined plan all modules that are listed will be updated “automatically”.

Important!!!

Whenever a measures plan is defined it should always be printed out before proceeding in order to document the work performed, by attaching it to the repair order.

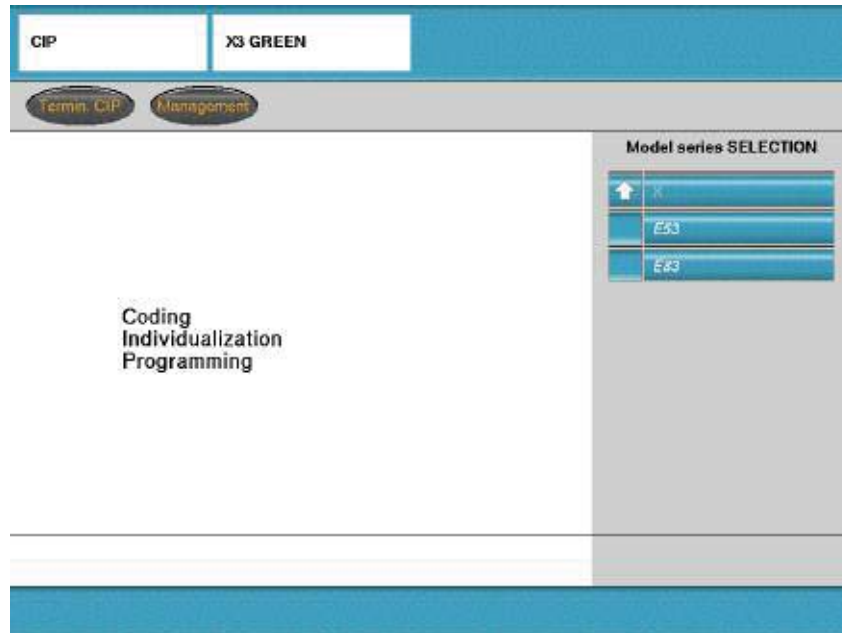
Note: An all inclusive status report or measures plan is only generated for vehicles equipped with a MOST-bus, to ensure compatibility. For all other vehicles a measures plan is generated only for the module selected to be updated (i.e. DME, TCU, EGS...) no evaluation of the other modules in the vehicle is made.

Initial CIP Screen



From the initial CIP screen select the model for which a coding or programming session is to be performed.

CIP Main Selection Screen



Selection of CIP functions/options:

Termin. CIP - End the CIP program and return to Progman home screen

Load SW - Load software function to be selected if:

- Control module has been replaced
- Retrofit process is to be carried out
- Vehicle software is to be updated
- Coding/programming of one or more module(s) is to be performed

CKM - Vehicle and Key Memory/Individualization allows various driver selectable features (such as drive way locking, seat memory, central locking/unlocking, daytime running lights etc.) to be coded to the vehicle or individual keys.

Management - Provides the ability to:

- Display the current version of CIP installed
- Print previously performed Service Measure Reports
- Run a test on the software currently installed on system (SSS)

Vehicle - Allows access to:

- Vehicle Order
- Initialization
- Service Functions
- Complete vehicle coding

Control Module Replacement Yes/No

The screenshot shows a software interface with a blue header bar. On the left, there is a 'Load software' button and a text field containing 'X3'. To the right of the text field, the text 'E83' is displayed above 'W8AAA00000WC44237' and '2871 km'. Further right, there are two small bar charts and two terminal voltage readings: 'Terminal 30 : 13.21 V' and 'Terminal 35 : 13.43 V'. Below the header bar is a grey bar with five buttons: 'Print', 'Change', 'End', 'Minimize', and 'Hardcopy'. The main area of the screen is white and contains the text 'Have control modules been replaced on this car?' followed by a note: 'Note: For retrofits press No.' At the bottom of the screen, there are two buttons: 'Yes' and 'No'.

At this screen information is needed to determine which path is to be followed.

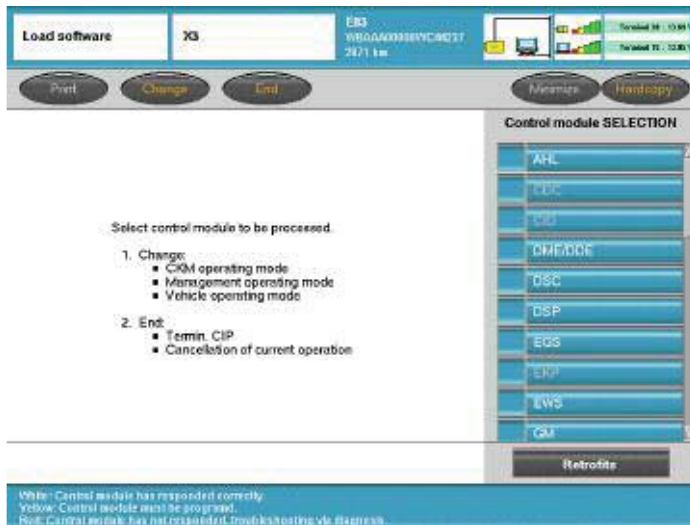
Answer **“Yes”** if:

- A previously installed control module has been replaced.

Answer **“No”** if :

- No control module(s) has been replaced but an update on one or more modules needs to be performed.
- A retrofit needs to be performed on the vehicle (such as installation of CD player, ULF, phone cradle installation, activation of bluetooth, etc...).
- A control module for a new system/accessory is installed as part of a retrofit installation.

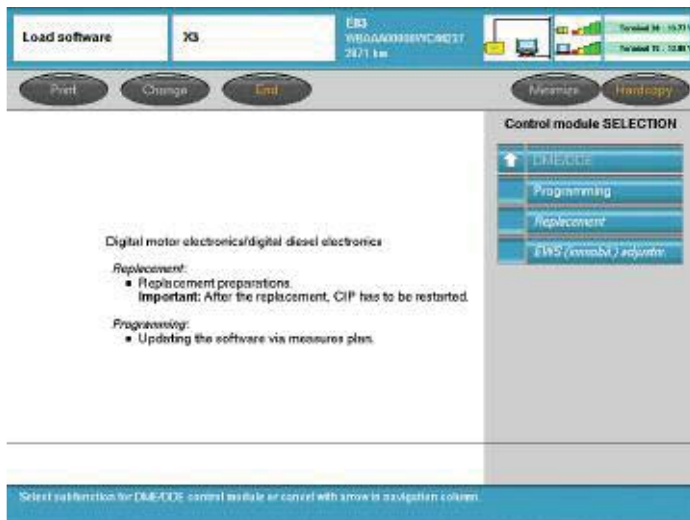
CIP Functions - If No (Non MOST-Bus Vehicles with VO)



Select the module to be reprogrammed

Or

Select **“Retrofits”** if an accessory function/feature is to be added or deleted.



Example: DME/DDE was selected on previous screen.

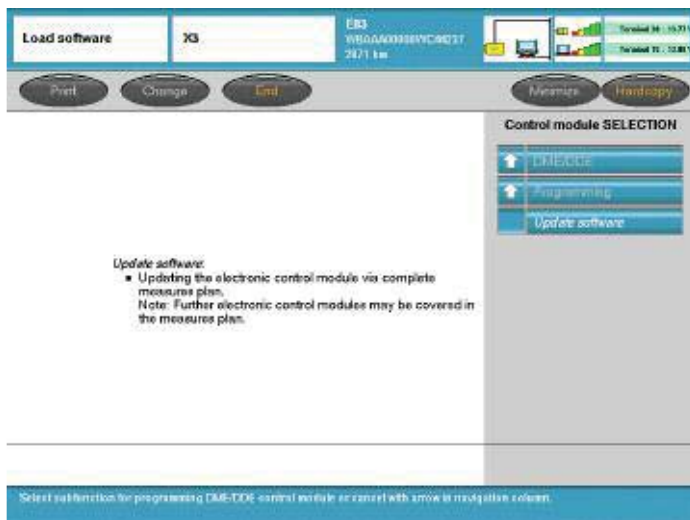
Programming is selected if:

- Checking for availability of updated software for selected control module.
- It is known that updated software is available for the selected control module.

Replacement is selected if a module was replaced.

EWS is selected if:

- Alignment of EWS & DME must be performed



Example: Programming was selected on previous Screen.

Upon selecting **“Update software”** a measures plan will be generated that is specific to the module selected.



A measures plan for the selected system/module is displayed.

A measures plan identifies the programmed part number for the control module(s) installed:

- “Old part no. progr. ctrl. mod.” - indicates p/n for software currently installed.
- “New part no. progr. ctrl. mod.” - indicates the p/n if the module is updated, by accepting the displayed measures plan the module will be updated to the new number and software.

Note: The “update” does not need to be performed if the two part numbers are the same.

On vehicles without a MOST-Bus, a “Measures plan” provides information on updates that are available for the selected control module. By selecting accept, only the module listed in the measures plan will be updated.

Note: Prior to selecting accept, printout a copy of the measures plan and attach it to the repair order to document the work performed.

Important!!!

If the measures plan identifies any control modules that will need to be replaced exit CIP.

For additional information pertaining to programming using CIP refer to **SI B09 05 01**.

CIP Functions - If No (MOST-Bus Vehicles)



After selecting “No” CIP evaluates the installed control modules to determine if any updates are required.

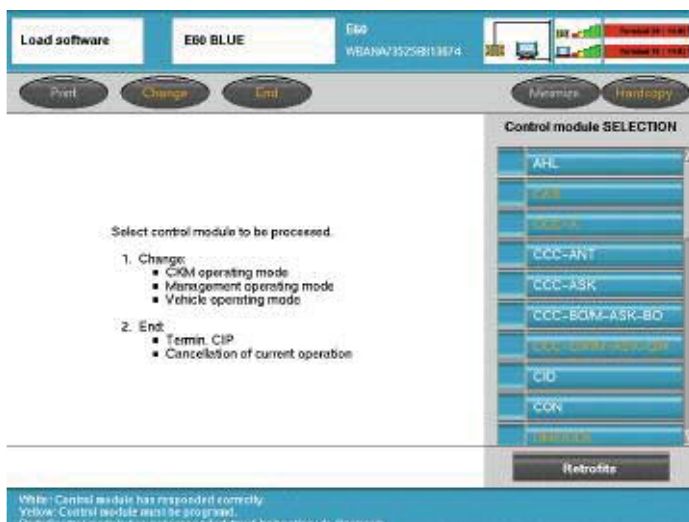


Once the evaluation is completed and CIP determines that there are updates available a “Status report” is generated.

Note: Status report is similar to a measures plan.

The status report identifies the control modules for which an update is available and also indicates if the module will need to be reprogrammed or replaced.

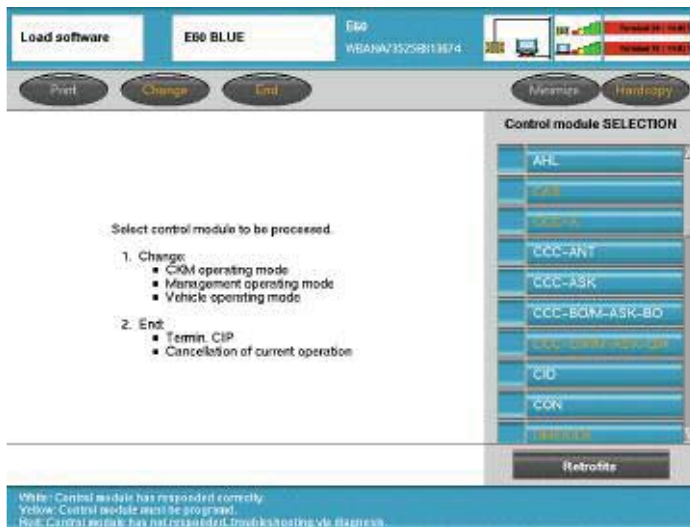
Information is also provided indicating the current programmed part number and also what the number should be after an update is performed.



If “Cancel update” is selected or if CIP determines that there are no updates needed or available for the vehicle then the “Control module selection” screen is displayed.

For additional information pertaining to programming using CIP refer to **SI B09 05 01**.

Control Module Selection - Programming - Update Software



From the “Control module selection” screen specific control modules can be selected for reprogramming.

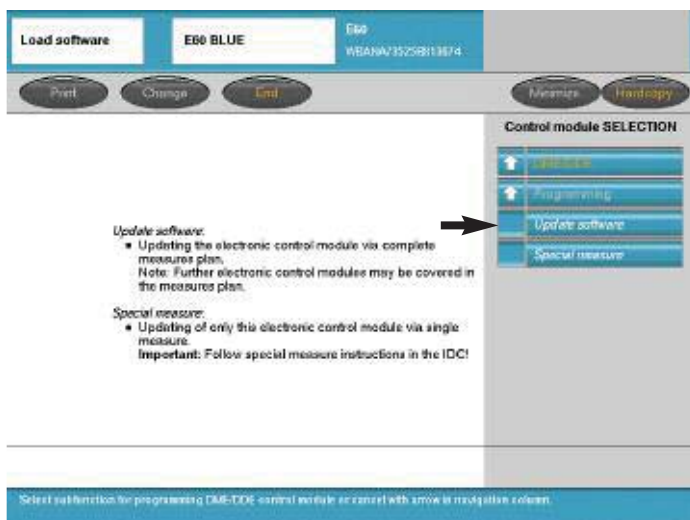
Or

Select “**Retrofits**” if an accessory function/feature is to be added or deleted

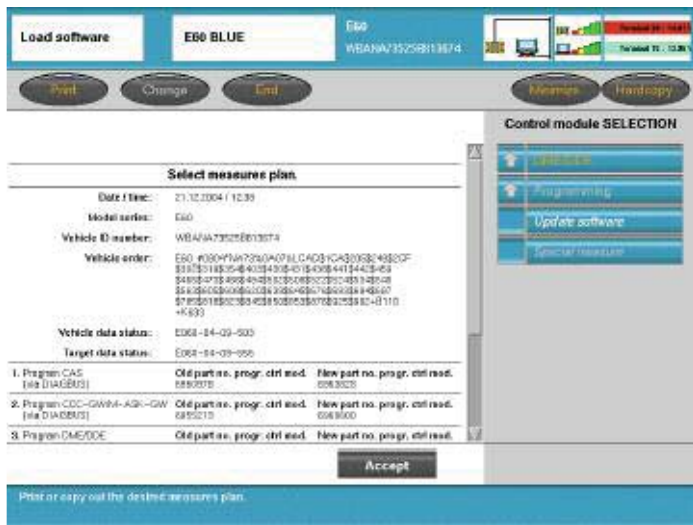


Example: DME DDE is selected on the previous screen.

By selecting “**Programming**” the software of the selected module can be updated or a measures plan for all installed modules can be obtained and updated.



By selecting “**Update Software**” a measures plan will be generated that will indicate what updates if any are available not only for the DME but for all modules installed in the vehicle.

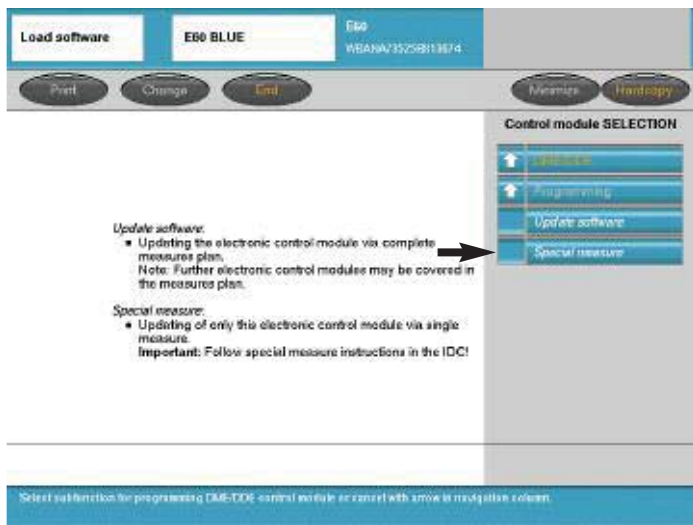


A “Measures plan” provides information on updates that are available for all installed control modules. By selecting accept, all modules listed in the measures plan will be updated.

Note: Prior to selecting accept printout a copy of the measures plan and attach it to the repair order to document the work performed.

Important!!!

If the measures plan identifies any control modules that will need to be replaced exit CIP.



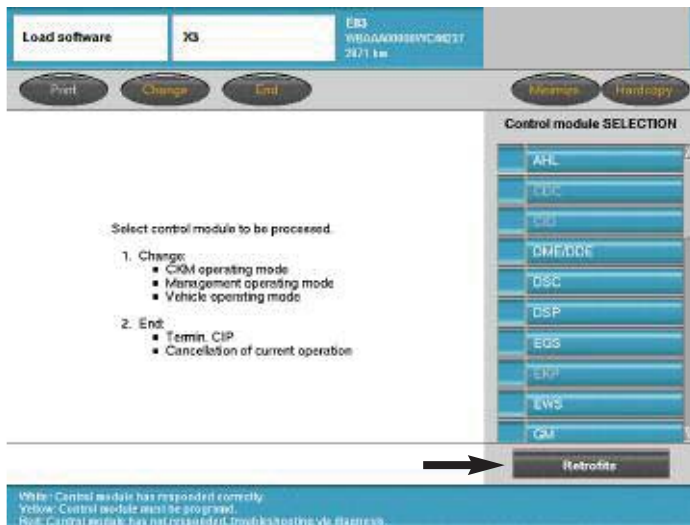
Important!!!

The “Special Measures” function is only to be used in the event that a control module(s) can not be programmed during the “Update Software” process that is executed as a result of a developed “Measures plan”/“Status report” or specific instructions are given in a Service Information Bulletin which require the use of special measures to update a module.

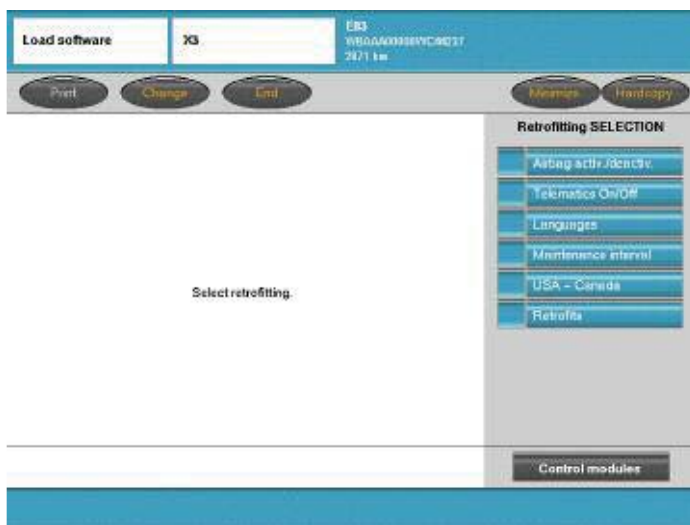
Control Module Selection - Programming - Special Measures

In the event that a control module(s) can not be programmed successfully the information will appear next to the specific module(s) in the final report, which is generated upon completion of an update or “Measures plan”.

Retrofits



Select **“Retrofits”** to view a list of functions/features that can be modified or installed.



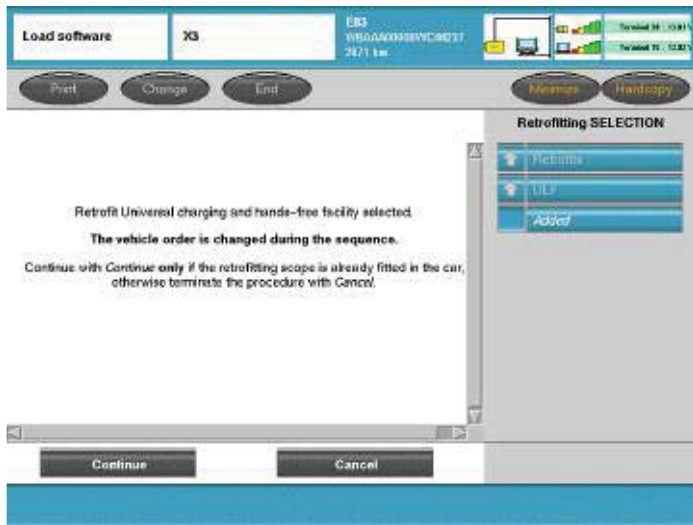
The initial screen displays information pertaining to:

- Airbag activation/deactivation
- Telematics On/Off
- Language (setting control display/monitor language)
- Maintenance interval - reset/checking
- USA-Canada conversion
- Retrofits - listing accessories installed or available for installation.



By selecting **“Retrofits”** on the previous screen a list of accessory systems available for installation is obtained.

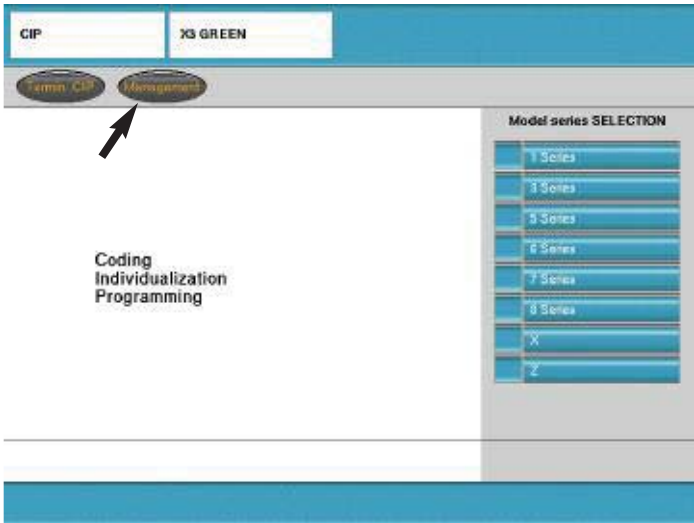
Note: Some of the items listed may not be available as retrofits for US vehicles. Please refer to ASAP portal on Centernet for more information.



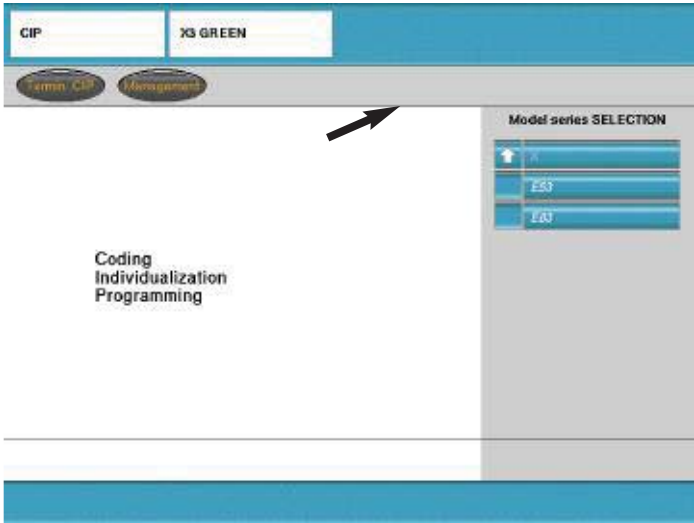
Example: *ULF* was selected on previous screen.

If this system/module is installed the vehicle order will be modified to reflect the addition of this module/accessory to the vehicle by selecting **“Continue”**.

Management



“Management” can be selected from the main/initial CIP screen.

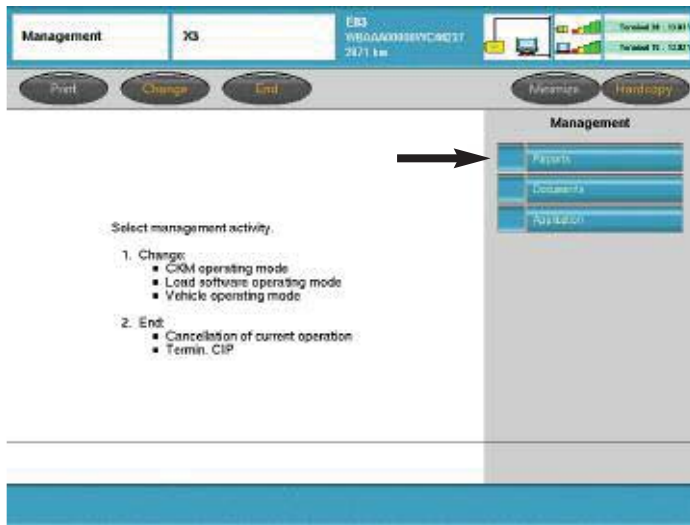


Or
“Management” can be selected from the Main CIP Selection screen.

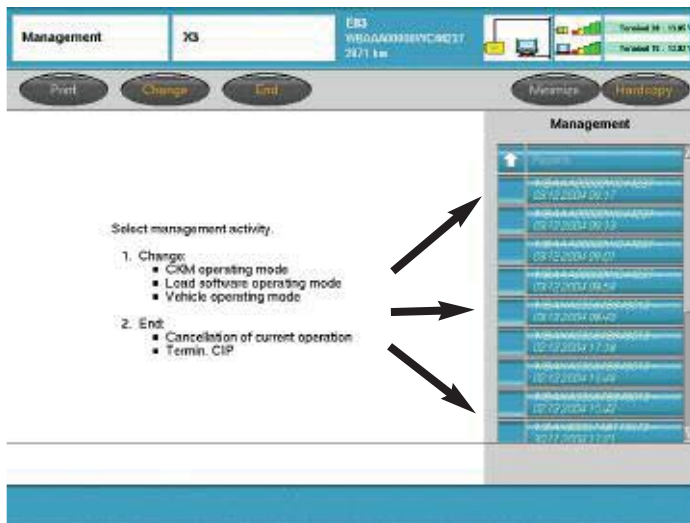
By selecting “Management” the following functions can be accessed:

- Print previously performed Service Measure reports
- Display the current version of CIP installed
- Run a test on the software currently installed on the system (SSS)

Management - Reports



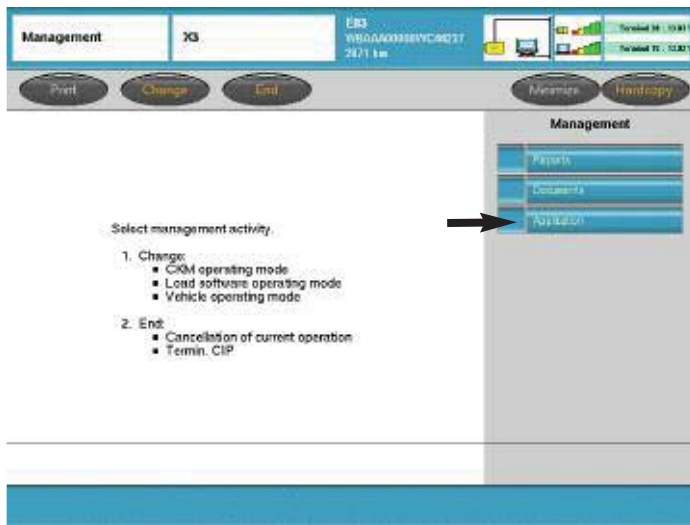
To access the most recently generated measures plans select **“Reports”**.



The 16 most recently generated measures plans can be accessed/viewed.

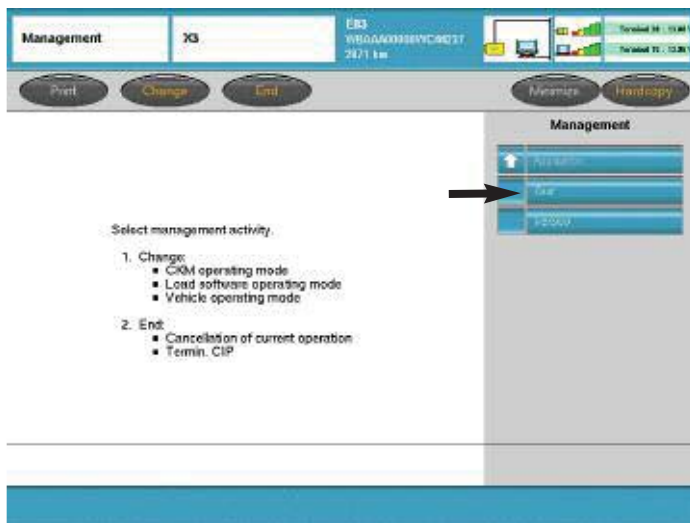
NOTE: The reports are not specific to the vehicle currently connected but are a cumulative listing of vehicles recently connected/accessed using CIP via a specific SSS.

Management - Application - Test & Version

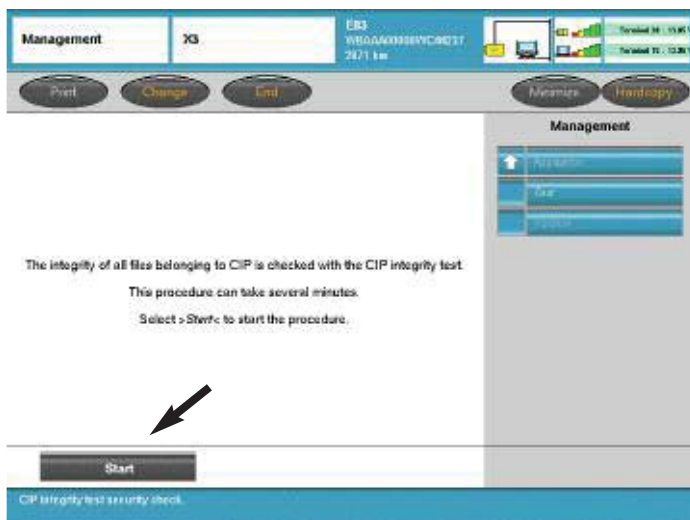


The “Application” function provides the ability to:

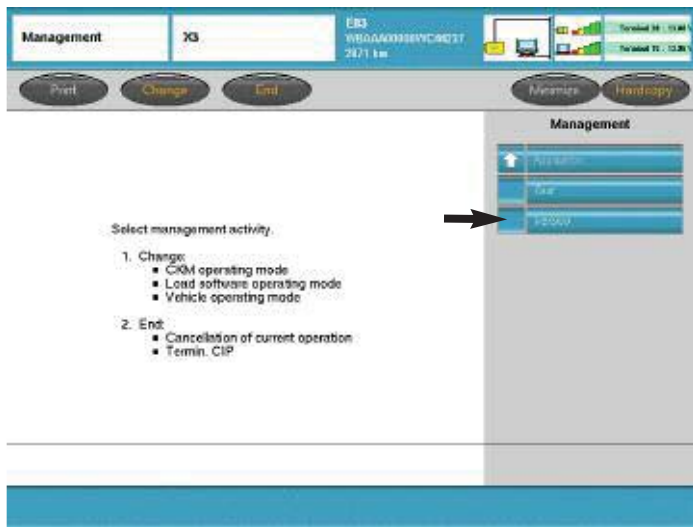
- Run a system test
- Determine information regarding the version of CIP currently installed



Select “**Test**” if system files are to be checked.



By selecting the “**Start**” button a brief test of the system files will be performed.



By selecting **“Version”** installed application information will be displayed.



A list of the various files/applications installed as well as their software levels is displayed.

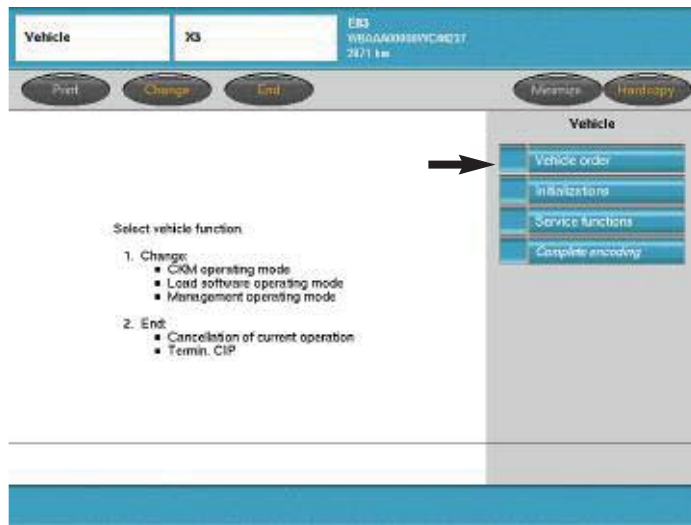
Vehicle



“**Vehicle**” can be selected from the main CIP selection screen to access additional functions:

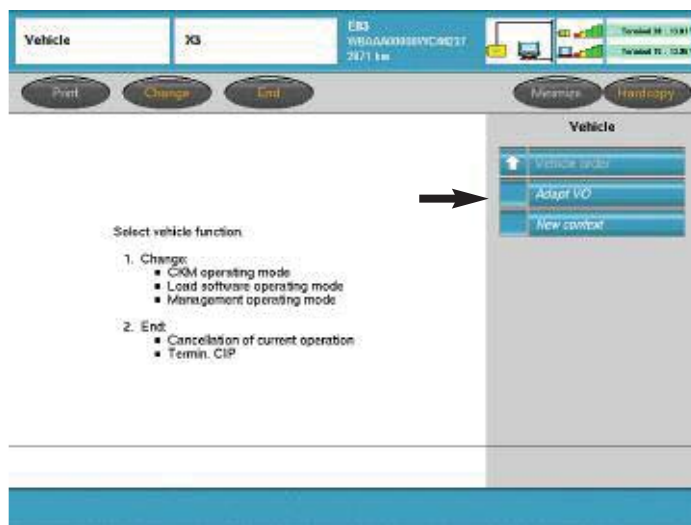
- Vehicle order
- Initialization
- Service functions
- Complete encoding

Vehicle - Vehicle Order

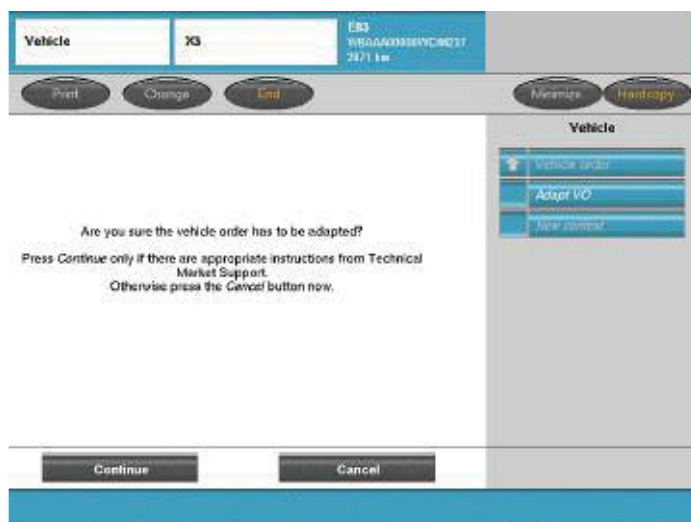


By selecting **“Vehicle order”** the ability to adapt/modify the vehicle order can be accessed.

Note: Changing the vehicle order may affect vehicle operation. Modifying the vehicle order should only be performed when directed to do so by the Technical Hotline, Service Information Bulletin or Aftersales Installation Instructions.



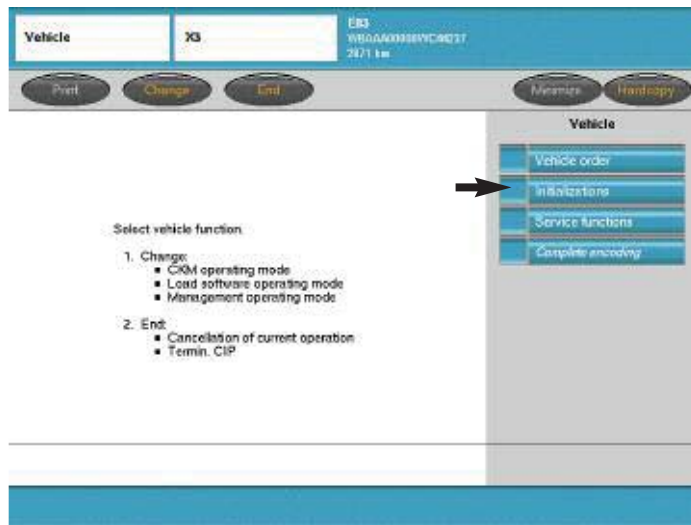
Selection of **“Adapt VO”** provides the ability to install a modified Vehicle Order file.



Before selecting **“Continue”** a floppy disk (1.44) containing the modified/new vehicle order must be inserted into the disk drive of the SSS.

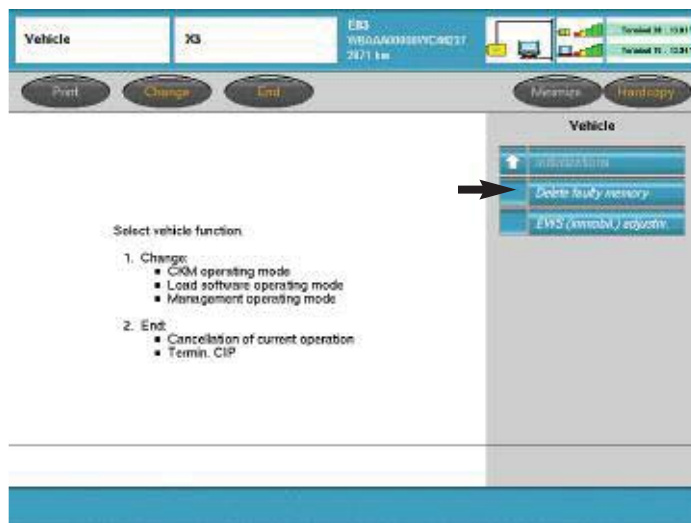
Note: The modified VO file is obtained from the Technical Hotline by submitting a PUMA case requesting a modified VO, the PUMA case should indicate what accessory/feature needs to be added or removed. The modified file will be sent via E-mail and must be copied on to a 1.44” floppy disk. Do not attempt to open the received file on a PC, as this may corrupt the data contained in the file. (Refer to SI B 09 05 01)

Vehicle - Initialization

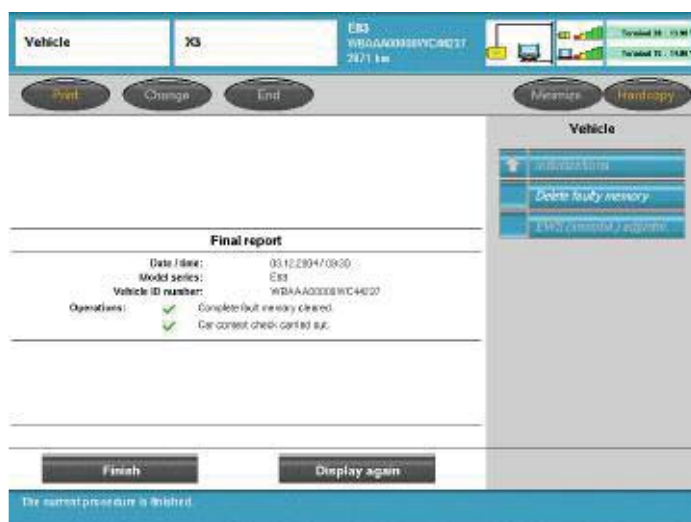


The **“Initialization”** function provides access to three different functions:

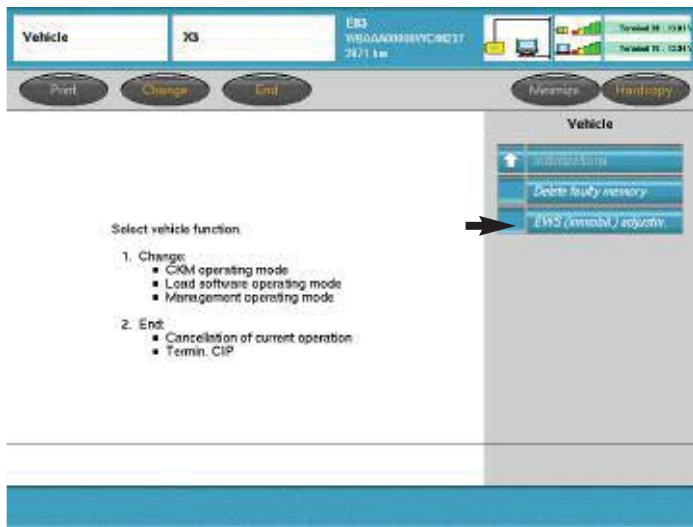
- Start system time - Used to synchronize all modules contained on the vehicles byte-flight bus.
- Delete fault memory
- CAS or EWS calibration



By selecting **“Delete fault memory”** the fault memory of all installed control modules will be cleared.



Displays a report pertaining to the clearing of the fault memory on all installed modules.



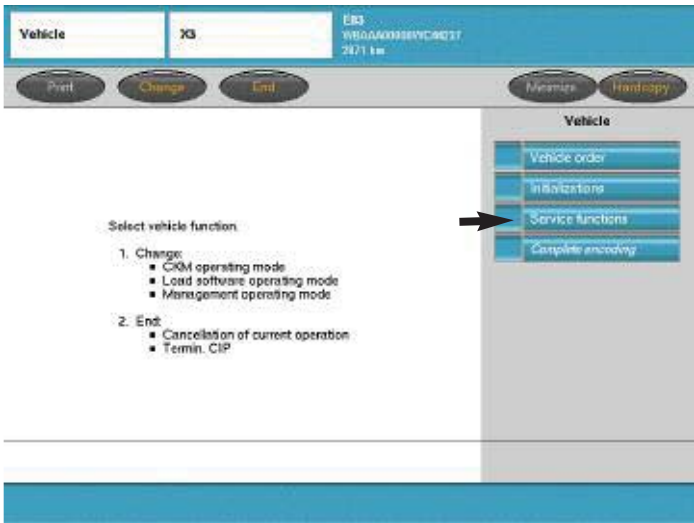
By selecting **“EWS adjustm.”** or **“CAS Calibration”** the rolling code tables can be initialized.



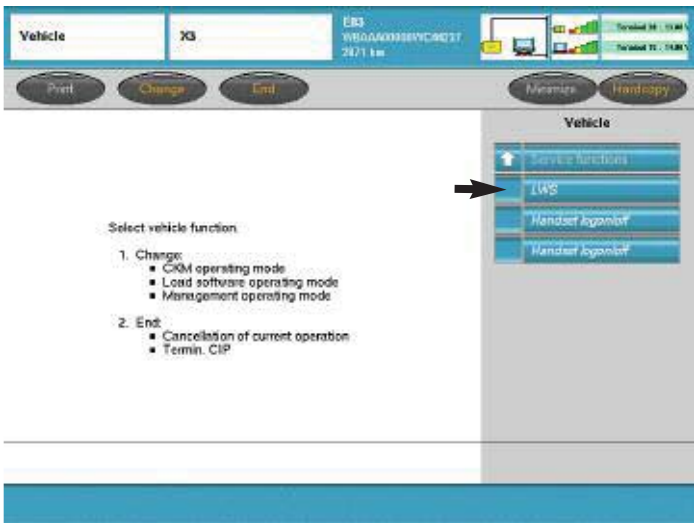
By selecting **“Yes”** the calibration/initialization of the rolling code tables in the DME and CAS or EWS modules will be carried out.

Vehicle - Service Function

The **“Service function”** feature provides access to various calibration functions.



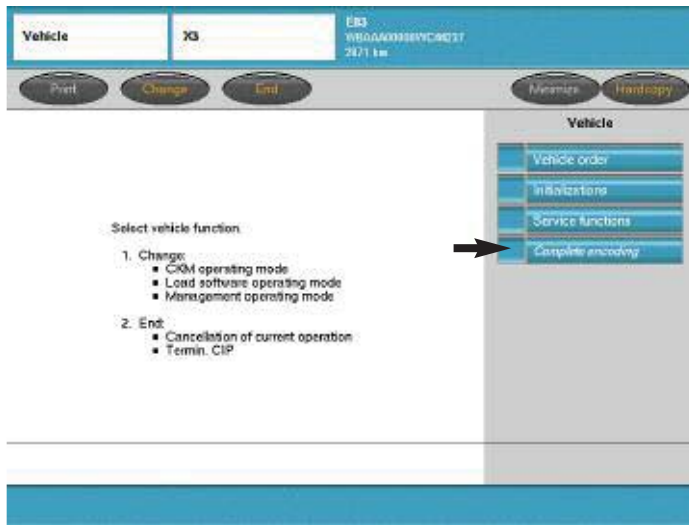
Selecting **“LWS”** will provide the ability to calibrate the steering angle sensor.



By selecting **“Continue”** the process to calibrate the steering angle sensor will be carried out.



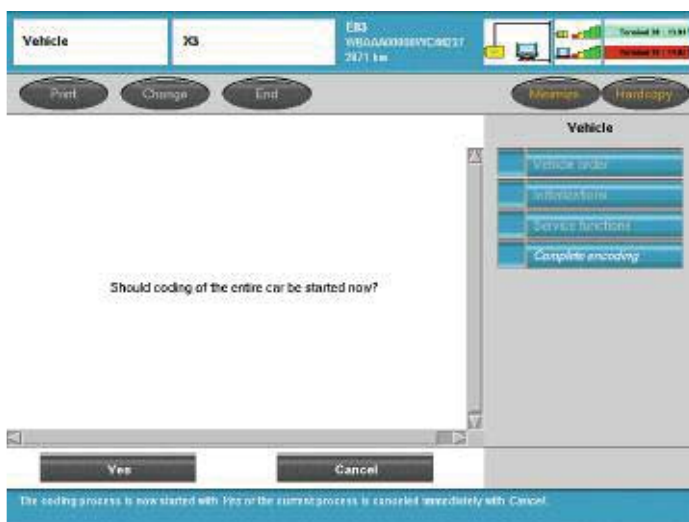
Vehicle - Complete Encoding



“**Complete encoding**” provides the ability to code/decode all control modules installed in the vehicle.

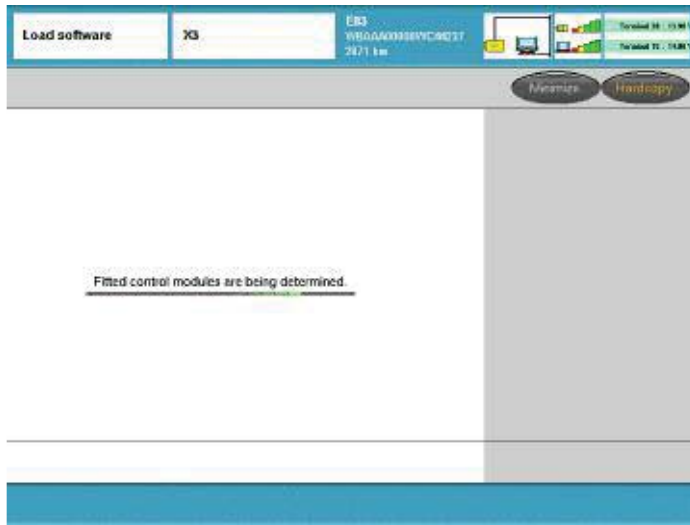


Recoding all the installed control modules may result in the loss of initialization or system settings such as radio station presets or seat/mirror memory.



By selecting “**Yes**” all installed control modules will be recoded based on the information contained in the Vehicle Order.

CIP Functions - If Yes



After selecting **“Yes”** on the Yes/No selection screen a determination/check of all installed control modules is performed.



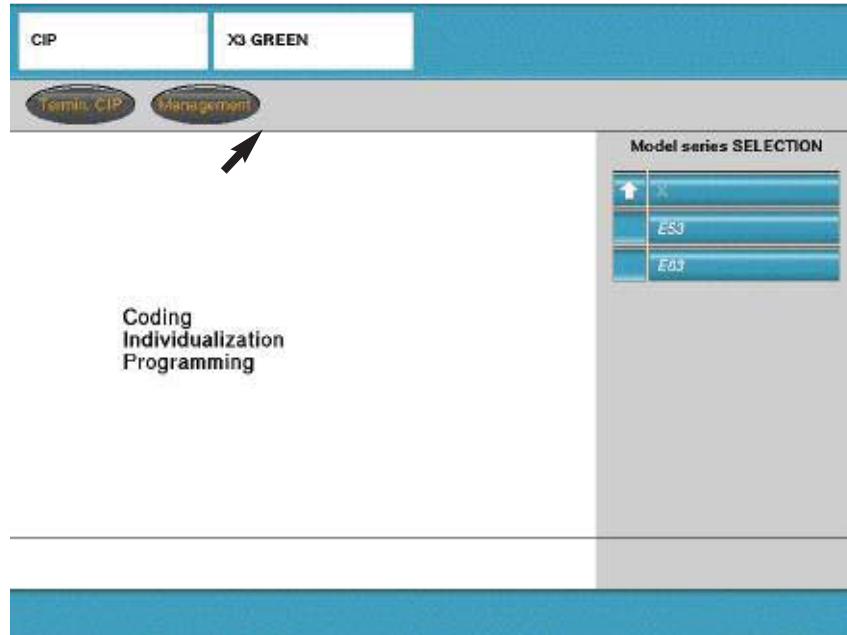
Upon completing a check of the installed control modules, a list highlighting the installed control modules is displayed.

Select the control module(s) that were replaced and select continue.

After selecting the replaced module(s) and selecting continue a measures plan will be generated which compares the integration levels (actual vs. target) for not only the modules replaced but for all installed modules as well. If any of the installed control modules do not match the target level they will be updated along with the replacement modules.

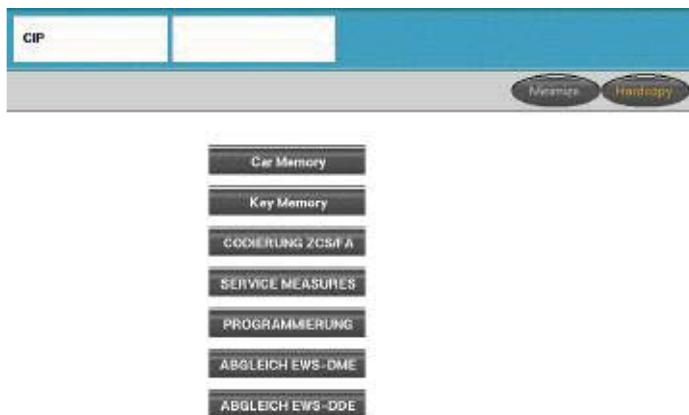
For additional information pertaining to programming replacement modules refer to **SI B09 05 01**.

CKM - Individualization (Vehicle & Key Memory)



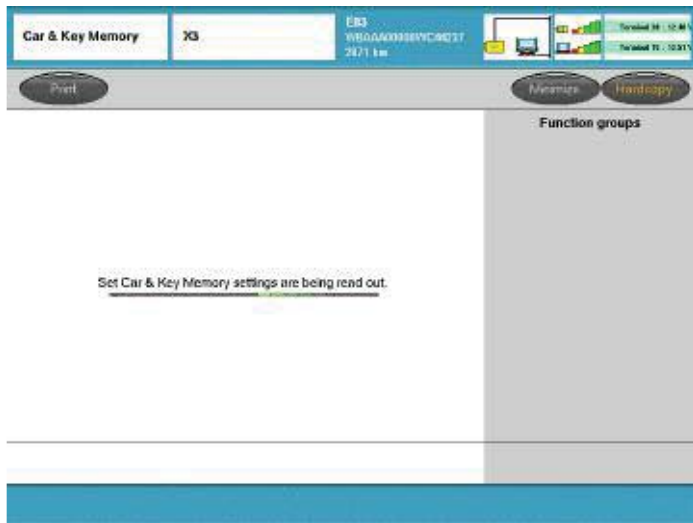
The CKM feature contained in CIP (for models produced as of the E65) provides the ability to “customize” certain vehicle and key functions to meet the specific preferences of the customer. It is important to note that the functions/features that can be “customized” will vary depending on model, equipment level and vehicle software level.

Upon selecting “CKM” a check of the current vehicle and key settings is made and displayed. The displayed settings list should be printed out and provided to the customer in order for them to select how the available functions should be set. The CKM function contained within CIP allows settings for both vehicle and keys to be made directly, the older version separates the key settings from the vehicle setting as different functions.



On older vehicles the Car Memory and Key Memory settings can be accessed via the SGC/UNIX function (refer to Progman Module and the section pertaining to accessing CIP Functions for E31/E32/E34/E36/E38/E39/E46/E52/E53).

Detailed information pertaining to CKM configuration is available in **SI B09 03 98**.



Upon selecting “**CKM**” a check of the current vehicle and key settings is made.

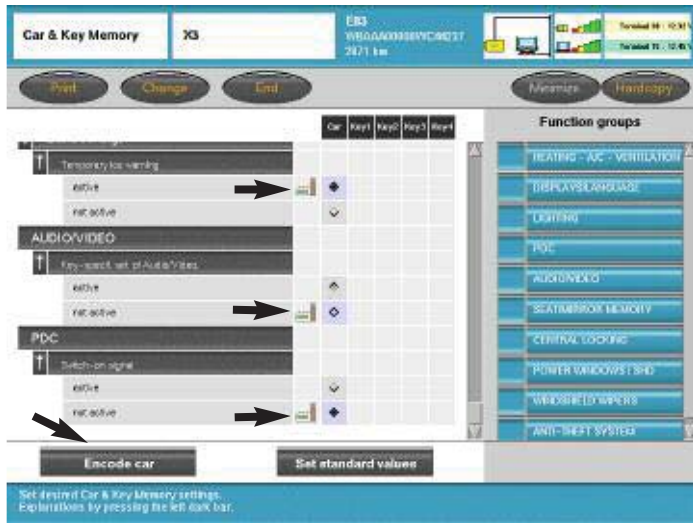


Once the check is complete the current settings are displayed and can be printed out.



Changes to the current settings can be made by selecting the preferred function.

Note: Some preference settings can be made that are specific to the key being used.



The factory default settings are identified by a “factory” symbol.

To except/code the new setting to the vehicle or key select **“Encode car”**.



To lock the changes to the vehicle and/or keys select **“Save”**.

By selecting back additional changes can be selected or the function aborted.



Once the new values are stored/set a final report showing the new setting will be displayed. The report will also show if the effected modules did or did not accept the changes.

ZCS Coding Procedure

The ZCS coding procedure can currently be performed with the DISplus using DIS CDs until DIS CD 42 is released at which time all SGC/Unix coding and programming functions will be available only via Progman using the GT1 or SSS.

There are two methods of encoding replacement control modules:

- Manual input of ZCS
- Automatic ZCS retrieval and coding

Coding Control Modules that Store the ZCS

On earlier production vehicles when replacing a control module that stores the ZCS code (i.e. Kombi?Instrument Cluster) the information must be entered manually in order to code the replacement module. The ZCS code from the label located in the vehicle or a print-out of the code stored in the module to be replaced must be entered into the new module.

The control modules that store the ZCS and require manual input are:

- IKE - E38
- EKM - E31
- Instrument Cluster - E32/34 (After 9-91) & E36 (except 318ti and Z3 Roadster)
- EWS II - 318ti & Z3 Roadster

Note: As long as the defective EWS II control module can communicate with the coding equipment, automatic encoding is possible.

On later production vehicles where the ZCS information is stored in two modules, redundant data storage, the ZCS information to code the replacement module can be obtained from the second/backup module.

Vehicles which have redundant ZCS data storage are:

- E36 (Z3) - Instrument Cluster & EWS II as of 9/98
- E39 - Instrument Cluster & EWS II
- E46 - Instrument Cluster & LSZ
- E53 - Instrument Cluster & LSZ

Note: E46 changed from ZCS to a Vehicle Order (VO/FA) vehicle data structure in 9/01.

Manual Input of ZCS Data



From Progman establish a connection to the interface connected to the vehicle and access CIP.

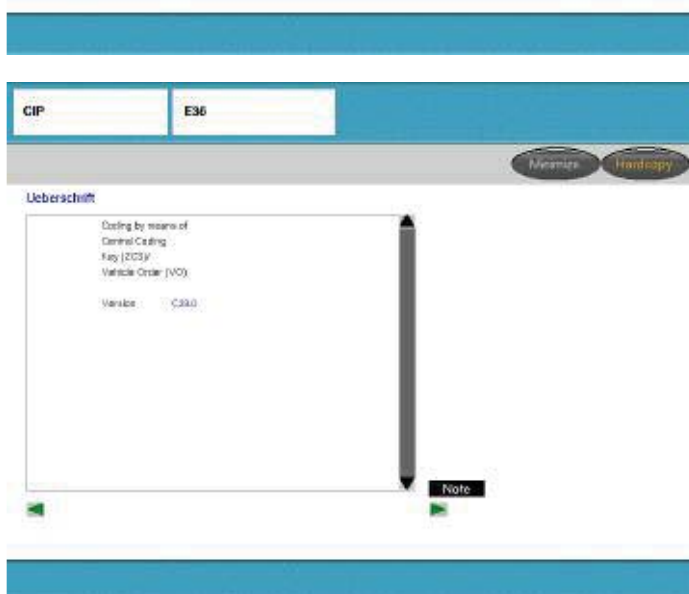
To perform the procedure from CIP the Model series must be selected **(3 series, 7 series ...)**.

Then select the body **(E32, E36 ...)**.



Select **“Codierung ZCS/FA”**.

Then advance screen to the right two times to enter the vehicle series selection screen.



The version ID page is displayed.

Make sure it is the most up-to-date version of the software for the encoding procedure.

Press the right arrow.



Select vehicle series (i.e. **"E36 Series"**).



Select **"Recoding"**.

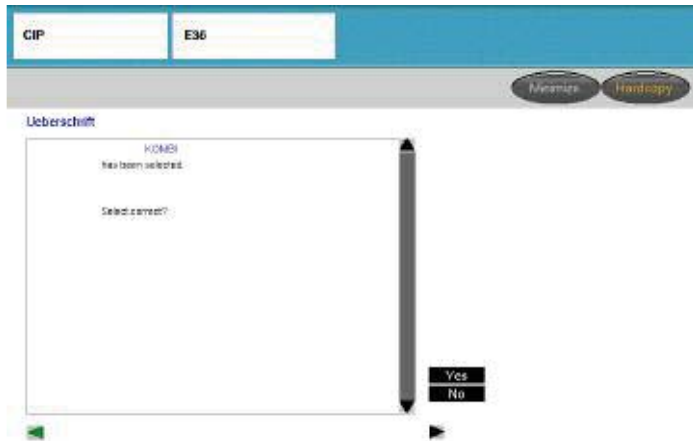
Then advance screen to the right.



Displays control modules that are ZCS codable.

Example:

Select **"KOMBI"**.



Select **“Yes”** to recode KOMBI.



Follow the instructions given on screen.

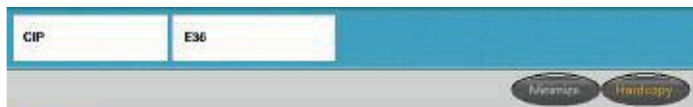


Chassis number of vehicle is displayed.

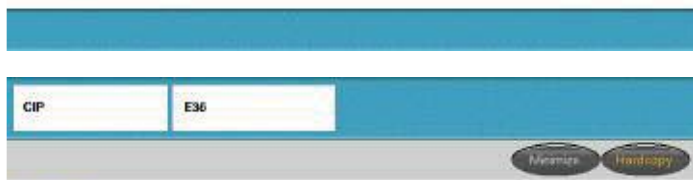
Select **“Yes”** to accept VIN.

Select **“No”** if VIN needs to be changed.

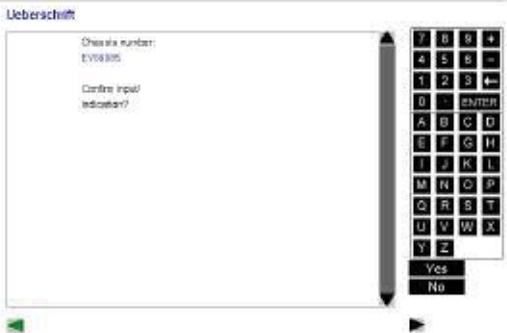
When installing a new module the last 7 digits of the VIN will need to be entered.



Follow the instructions given on screen.



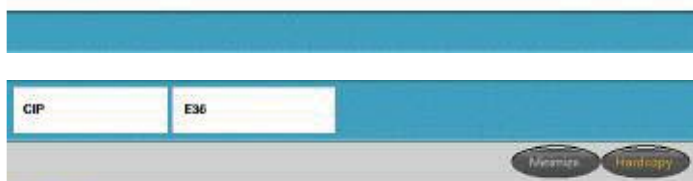
Chassis number of vehicle is displayed, enter VIN using touch screen pad or the keyboard on an SSS.



Select **“Yes”** to accept VIN.

Select **“No”** if VIN needs to be changed/corrected.

When installing a new module the last 7 digits of the VIN will need to be entered.



Current ZCS code is displayed

Select **“YES”** to accept current code

Select **“No”** to change the ZCS data



When installing a new module the ZCS code of the vehicle will need to be entered. The information can be obtained from:

- ZCS print out of old module before removal
- ZCS label located in vehicle



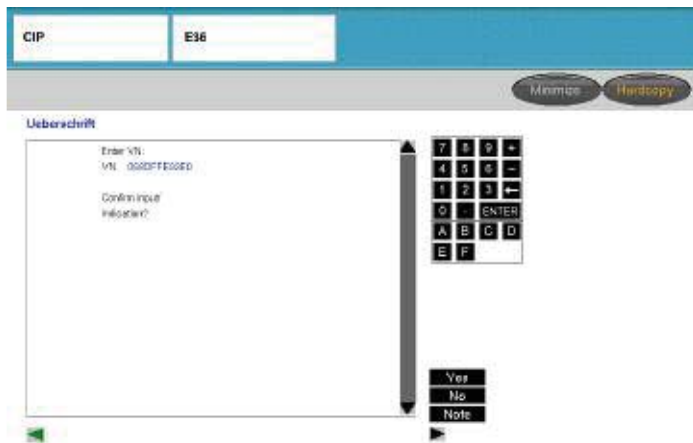
If the ZCS code must be changed follow the instruction given on screen and enter the required information exactly as indicated on the ZCS label or printout of ZCS code before removal of module.



Confirm or enter new GM information.



Confirm or enter new SA information.



Confirm or enter new VN information.



Confirm or correct ZCS information.



Select **“Yes”** to begin the coding process for the installed/selected module.

Upon completion of the coding process print out a copy of the ZCS information displayed and attach it to the repair order to be maintained with vehicle file.

Switch ignition off for 10 seconds, then check for proper system operation.

Automatic Coding Procedure

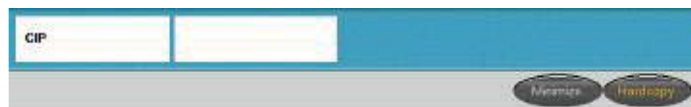
When a control module is replaced that does not store the ZCS code, the replacement module is coded automatically using the ZCS code stored in the Kombi, EWS or LSZ.



From Progman establish a connection to the interface connected to the vehicle and access CIP.

To perform the procedure from CIP the Model series must be selected **(3 series, 7 series ...)**.

Then select the body **(E32, E36 ...)**.



Select **“Codierung ZCS/FA”**.

Then advance screen to the right two times to enter the vehicle series selection screen.





The version ID page is displayed.

Make sure it is the most up-to-date version of the software for the encoding procedure.

Press the right arrow.



Select vehicle series (i.e. **"E36 Series"**).



Select **"Recoding"**.

Then advance screen to the right.



Displays control modules that are ZCS codable.

Example:

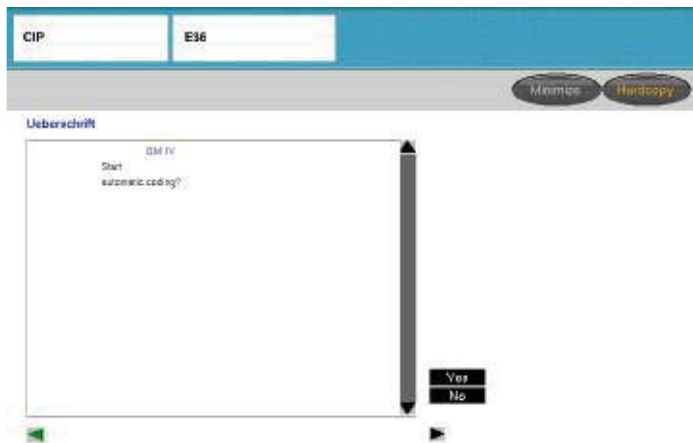
Select “ZVN II/GM (ZKE IV)”.



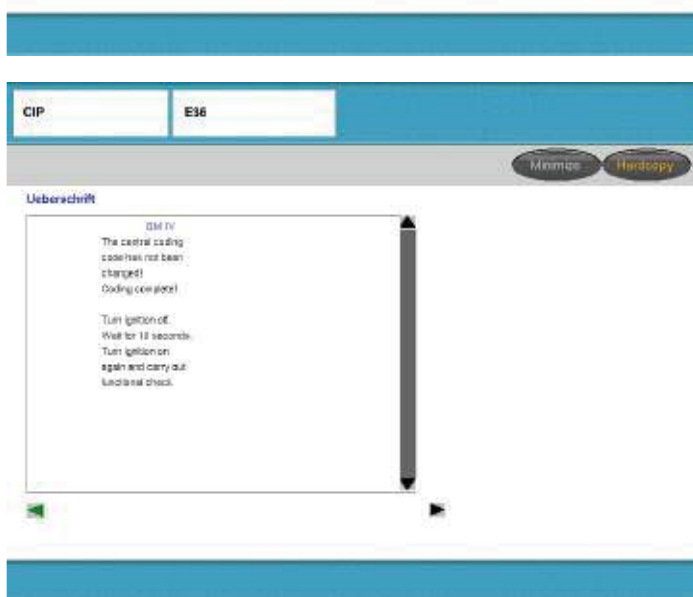
Confirm module selection.



If a replacement module is to be installed install it now.

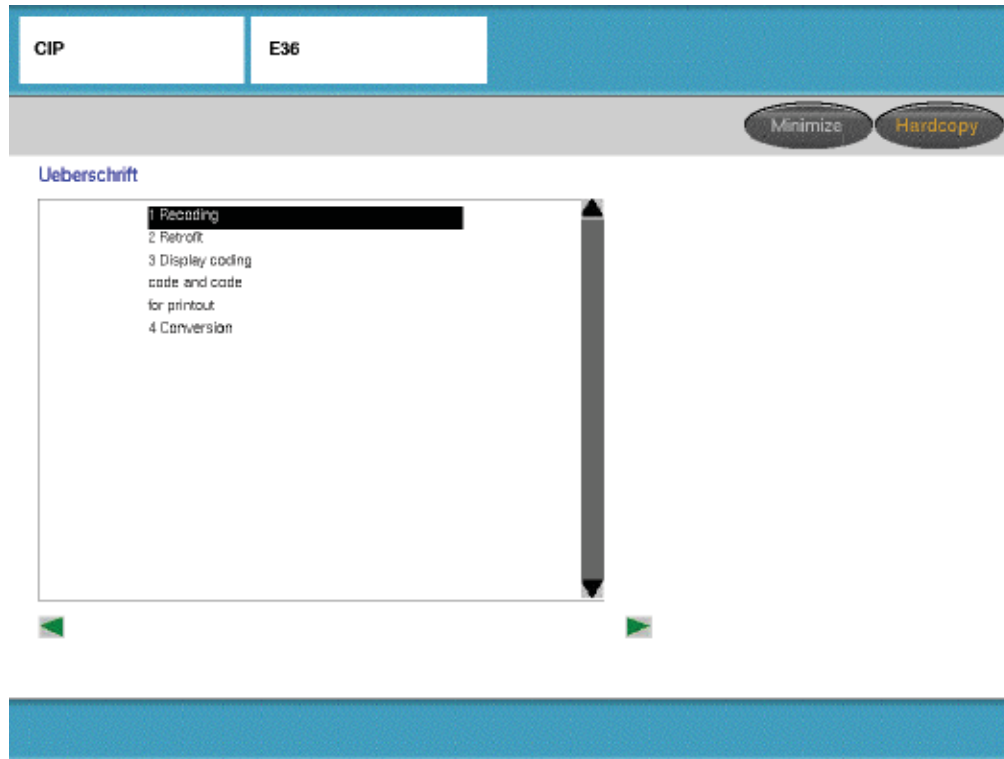


Select **“Yes”** to begin coding or recoding the selected module.



Coding/recoding process of selected module is complete, follow the instructions given.

Additional ZCS Coding Functions



Retrofit

The retrofit function allows options or accessory equipment to be added after the vehicle is manufactured.

By selecting to install a new option/accessory from the list of available retrofits for the specific vehicle, the ZCS information will be updated to reflect the addition of the new option or accessory that was installed. Updating of the ZCS information will ensure that the new component is recognized and able to communicate with the other modules in the vehicle.

Conversion

The conversion function allows specific features of certain control modules/systems to be modified, similar to the way Individualization(Vehicle & Key Memory) is used on newer models to “customize” a vehicle.